MERCHANT SHIPPING SECRETARIAT
GOVERNMENT OF SRI LANKA
CERTIFICATE OF COMPETENCY EXAMINATION

GRADE : OFFICER IN CHARGE OF A NAVIGATIONAL WATCH ON SHIPS OF 500 GT OR MORE (UNLIMITED)

SUBJECT : OCEAN AND OFFSHORE NAVIGATION

DATE : 16.08.2023 Time : 0900 to 1200 hrs

Time allowed **THREE hours** Total marks : 160

ANSWER ALL QUESTIONS Pass marks : 70%

Formulae and all intermediate steps taken in reaching your answer should be clearly shown. You may draw sketches wherever required. Electronic devices capable of storing and retrieving are **not** allowed.

1) A vessel in position A: $35^0$24'N, 150^0 00'Ehas to proceed to position B: 30^0 12'N, $130^0$00'W by a great circle track. Find the following;

a) Great Circle distance

b) Initial course

c) Final course

d) Position of the vertex

(35 marks)

2)a) Find by plain sailing method the Course and Distance from A: 15^0 12'S 035^0 48'W to B: 22^0 54'S 029^0 18'W.

(15 marks)

b) A vessel in position60^0 00'N 020^0 00'W steers a course of 270^0 (T) for a distance of 300 nm. Find the position arrived.

(10 marks)

3) On 5th Mar 1992, AM at ship in DR 38º 06'S 151º 12'E, the sextant altitude of the Sun's LL was 35º 59.8' when the chronometer showed 10h 53m 42s (error was 01m 48s slow). If IE was 1.8' off the arc and HE was 26m, find by intercept method the direction of the PL and the position through which it passes.

(35 marks)

4) On 1st Dec 1992, PM at ship in DR 29^0 48'S $106^0$08'E, the sextant altitude of SATURN was 46^0 21.3' when the chronometer showed 12h 20m 08s (error 03m 16s slow). If IE was 1.2' off the arc and HE was 17m, find the direction of the PL and the longitude where it crosses the DR latitude and a position through which to draw it.

(35 marks)

5) On 1st Dec 1992, AM at ship in DR 47^0 24'N$143^0$18'E, the sextant altitude of the Polestar was46^0 50.4' at 08h 50m 10s chronometer time (error 05m 52s slow). If IE was 2.0' off the arc and HE was16m, find the direction of the Position Line (PL) and a position through which it passes.

(25 marks)

6) a) On 26th February 1992, in DR $50^0$18'S, $064^0$30'E, the observed altitude of the Moon's LL on the meridian was 63^0 56.0'. If HE was 18m, find the latitude and direction of the Position Line.

(25 marks)

b) In DR 48^0 27'N 179^0 58'E, find the position of the ship from the following two observations:

i) Intercept 1.0' towards, azimuth 340^0

ii) Observed Long 179^0 56'W, azimuth 035^0

(20 marks)

Answers – 1

1) GCD = 3933.3’

Initial Co = N 69^0 12.8’ E

Final Co = S 61^0 51.2’ E

Lat of V = 40^0 21.2’ N

Long of V = 176^0 45.8’ W

Answers – 2

2) a) Course = S 38^0 35.2’ E

Distance = 591’

2) b) D’ Long = 10^0 00’ W

Position Arrived = 60^0 00’ N 030^0 00’ W

Answer – 3

3) GMT = 04th Mar / 22 55 30

LHA = 312^0 10.8’

CZD = 53^0 48.4’

TZD = 53^0 52.5’

Intercept = 4.1’ (Away)

Azimuth = N 65.9^0 E

PL = 155.9^0 – 335.9^0 (T)

Anserws – 4

4) GMT = 01st Dec / 12 23 24

GHA ⋆ = 300^0 06.0’

True Alt = 46^0 14.3’

LHA ⋆ = 046^0 18.7’

Obs Long = 106^0 12.7’ E

Azimuth = N 84.8^0 W

PL = 005.2^0 – 185.2^0 (T)

Answers – 5

5) GMT = 30^{th} November / 20 56 02

LHA γ = 167^0 17.1'

True Alt = 46^0 44.5'

Obs Lat = 47^0 14.7' N

Az = 359.1^0

PL = 089.1^0 – 269.1^0 (T)

Answers – 6

6) a) Long Corr^n = 9 min

Correct GMT Mer Pass = 26^{th} Feb / 02 17 00

True Alt = 64^0 27.2' N

MZD = 25^0 32.8' S

Obs Lat = 50^0 09.2' **S**

PL = E – W

6) b) D' Lat = 1.65' N

= 1.7' N

Dep = 1.65' E

D'Long = 2.5' E

Fix Lat = 48^0 28.7' N

Fix Long = 179^0 59.5' W